



Montana
Office of Public Instruction
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Science Model Teaching Unit Rocks as Tools

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Kindergarten - Approximate Duration: 150 minutes

Stage 1 Desired Results

Established Goals

Science Content Standard 1: Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.

Science Content Standard 4 Benchmark 4.2: Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide

Essential Understanding 1: There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each Nation has a distinct and unique cultural heritage that contributes to modern Montana.

Understandings

- Rocks have different textures, colors, weights, and uses as tools and structures.
- Rocks are non-living (Western science define rocks as being non-living, however living and non-living is not defined in the same way for Indigenous science. Some cultures view rocks as living).

Essential Questions

- How did people use rocks as tools long ago?
- How do people use rocks as tools today?

Students will be able to...

- classify rocks by attributes: flaky, crumbly, hard, soft, smooth, rough, colors, weight, etc.
- demonstrate the use of rocks as tools; for scraping, mashing, crushing, sanding, cleaning, staining, etc.

Students will know...

- rocks have different textures, hardness, weight and uses.
- rocks have a variety of uses.

Stage 2 Assessment Evidence

Performance Tasks

- Students will collect, sort, and chart samples of rocks.
- Students will play the Rock Counting Game

Other Evidence

- Students will participate in class activities, discussions, and ask appropriate questions.



Stage 3 Learning Plan

Preparations

- Several weeks before beginning this lesson collect rocks you will need. You'll need a variety of assorted rocks. The teacher should crack open some rocks or find them split or cracked so the class can compare the inside to the outside.
- Collect pictures of tools made from rocks. A good place to find some is: <http://mhs.mt.gov/education/footlocker/Prehistoric.pdf>, on pages 4 and 5; you may also want to check this footlocker out from the Montana Historical Society. You may also find some appropriate images and resources at <http://mhs.mt.gov/education/footlocker/ancienteachings.asp>.
- Set up your "cooperative learning groups." Groups should be no larger than four students.
- Assemble "Rock Counting Game," one for each cooperative learning group.

Learning Activities

Introduction: Read and discuss "Tunka-shila, Grandfather Rock" (Lakota [Sioux]-Great Plains story) or "Old Man Coyote and the Rock" (Pawnee-Great Plains story). Both Stories can be found in "Keepers of the Earth Native American Stories and Environmental Activities for Children" by Michael J. Caduto and Joseph Bruchac. Another option is a contemporary Crow story in the book *I Am a Rock & My Name is Pop*, distributed to all elementary school libraries by OPI.

1. Brainstorming activity: Ask and record answers from a discussion using the following questions as a guide. Record on a large poster or piece of paper.
 - "What is a rock?"
 - "Do you think rocks are living or non-living?"
 - "How have people used rocks in the past?"
 - "How do we use rocks today?"
 - "How do these Native American stories present rocks?"
 - "Are the rocks considered living or non-living within the stories?"
2. Extend the discussion on rocks as living or non-living things. Explain that in the Pend d'Oreille and Salish perspective, the Creator is present in all things. Everything has a purpose, and anything with a purpose is considered to be living. See pages 8 and 9 of "A Brief History of the Salish and Pend d'Oreille Tribes." (Available from the Salish & Pend d'Oreille Culture Committee.)
3. Vocabulary: With the students, make a list of words that describe rocks. Post the list in the classroom.
4. Display the gathered rocks and get student input on ways to describe the rocks. How are they the same or different? Discuss the properties of rocks (size, shape, texture, color). Referring back to the posted list. Give each child a brown lunch bag to bring to class 1-3 small (not too small) or medium-size rocks. They can also find rocks outside in the school yard. Add students' rocks to class collection.
5. Give each group of students a bin of rocks to explore and sort. They can sort by size, shape, texture, color. Have students chart and draw the sorted rock types, count, and label how many of each type they have in their container. Remind them to use the posted list as a reference. Walk around and monitor/discuss with the groups how they are sorting their rocks.
6. Using a variety of objects (nails, plastic picks, cloth, small stiff brushes, etc.) let the students pick, poke, and explore the attributes of the rocks to determine if they are hard, soft, crumbly, smooth, rough, different on the inside when cracked open, etc. Add to the classroom list more ways to describe rocks.

Science Kindergarten Rocks as Tools (continued)

7. Rocks as Tools – students will brainstorm and discuss the use of rocks as tools. Have pictures or actual tools for students to view. Pass around the pictures of indigenous’ tools made from rocks or project the Montana History Societies’ website photos. What were the tools used for and what type of rock would be best for that use? Hammering, pestles, scraping, mashing, scrubbing, cutting, cooking, etc.
8. Students will pick a rock and decide how it could be used as a tool. If possible have the children actually use the rocks as tools to scrape, mash, pound, etc.
9. Students will classify the tools by how they would be used.
10. Optional: Continue exploring the American Indian Traditional uses of the environment by inviting a tribal representative to demonstrate ancestral skills and technology.

Closing activity: Rock Counting Game (using pebbles as math tools)

Materials: Five smooth pebbles. Paint a half moon shape on one side of each of four pebbles and a star shape on one side of the remaining pebble. Pea gravel and paper cups for keeping track of points.

Play: Place the pebbles in a container (shoe box or a basket).
Let one child at a time hold the basket and give it a shake.
Then have the child count the number of shapes that turn up.

Scoring: You can have a point system game by allotting one point for each moon and two points for the star. Children can use pea gravel placed in a paper cup to keep track of their points.

Who Wins: After each child has five turns they count their pea gravel counters. The one with the most gravel wins. First one to a given number wins.

Materials/Resources Needed

- A good mix of rocks for student use
- Large nails, plastic pick, cloth, small, stiff brushes, etc.
- Plastic bins/boxes to hold sets of rocks
- Pictures of stone tools
- *Keepers of the Earth Native American Stories and Environmental Activities for Children* by Michael J. Caduto and Joseph Bruchac
- *I Am a Rock & My Name is Pop*, distributed to all elementary school libraries by OPI.
- “A Brief History of the Salish and Pend d’Oreille Tribes” by the Salish-Pend d’Oreille Culture Committee of the Confederated Salish and Kootenai Tribes, Salish-Pend d’ Oreille Culture Committee, 81 Blind Barnaby Street, P.O. Box 550, St. Ignatius, Montana 59865
- Montana History Society “Prehistoric Life in Montana” resource trunk
<http://mhs.mt.gov/education/footlocker/Prehistoric.pdf>
- Materials for one Indian counting game
- 5 smooth pebbles: 1 with a star painted on one side, 4 with a moon painted in each side
- 1 container for the smooth pebbles
- A handful of pea gravel for scoring
- 1 small container or paper cup for each player to put their pebbles in

Science Kindergarten Rocks as Tools (continued)

Extending the Lesson

This basic lesson can be extended to include exploration of sand and soil/dirt found in local landscapes as a place-based connection. Students could grind stones together to see if they can make sand. They could also use sand to scrub cloth and other materials to see the effects. Students could try dyeing cloth with red dirt. The extension on soil/dirt could also introduce the concept of how soil/dirt is made from rocks and sand.